KIMO®
INSTRUMENTS

# User Manual

Pressure • Temperature • Humidity • Air Velocity • Airflow • Sound level

Supplied with Calibration certificate

# HD 200
## *Hygrometer*

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## Technical features

**HD200 sensing elements**

Hygrometry : capacitive sensor
Temperature : Pt100 1/3 DIN

**HD200 connection**

**On the top :**
2 secured mini-DIN connectors for SMART-plus probes
**Left side :**
1 USB port
1 power supply plug

**Interchangeable measurement modules**

**Current / Voltage module:**
***Connection :*** 2 stereo jacks
**Thermocouple module :**
***Connection :*** 4 inputs for compensated miniature plug of thermocouple K, J ou T type
Class 1 (as per IEC 584-3)

**Display**

Graphic display 128x128 pixels
Dim. 50 x 54 mm
Blue blacklit
Display of 6 measurements (including 4 simultaneously)

**Housing**

ABS shock-proof
IP54

**Keypad**

Metal-coated, 5 keys
1 joystick

**Conformity**

Electromagnetic compatibility
(as per NF EN 61326-1)

**Power supply**

4 piles alcalines 1.5V LR6

**Ambient**

Neutral gas

**Operating and storage temperature**

Operating temp. : From 0 to +50°C;
Storage temp.: From -20 to +80°C

**Auto shut-off**

adjustable from 0 to 120 min

**Weight**

340 g

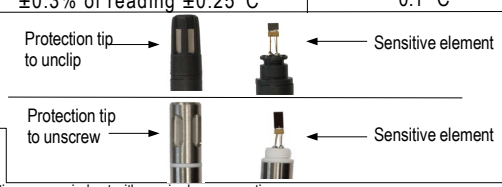
**Languages**

French, English

## Specifications

| | Measuring units | Measuring range | Accuracy* | Resolutions |
|---|---|---|---|---|
| **CURRENT / VOLTAGE** | | | | |
| | V, mA | From 0 to 2,5 V<br>From 0 to 10 V<br>From 0 to 4/20 mA | ±2mV<br>±10mV<br>±0.01mA | 0.001 V<br>0.01 V<br>0.01 mA |
| **THERMOCOUPLE (See related datasheet)** | | | | |
| | °C, °F | K : From -200 to 1,300°C<br>J : From -100 to 750°C<br>T : From -200 to 400°C | ±1.1°C or ±0.4% Reading value***<br>±0.8°C or ±0.4% Reading value***<br>±0.5°C or ±0.4% Reading value*** | 0.1 °C<br>0.1 °C<br>0.1 °C |
| **HYGROMETRY PROBES** | | | | |
| **STD** Relative humidity | % RH | From 3 to 98 % RH | **Accuracy** (repeatability, linearity, hysteresis)** :<br>±1.5% RH (From 15°C to 25°C)<br>**Factory calibration uncertainty:** ±0,88 %RH<br>**Temperature dependence :**<br>±0.04 x (T-20) % RH (if T<15°C or T>25°C) | 0.1 % RH |
| **STD** Absolute humidity | g/Kg | From 0 to 600 g/kg | | 0.1 g/kg |
| | | | | |
| Dew point | $°C_{td}$, $°F_{td}$ | From -50 to +80°$C_{td}$ | ±0.6% of reading ±0.5°C | 0.1 °$C_{td}$ |
| Ambient temperature | °C, °F | From -20 to +80°C | ±0.3% of reading ±0.25°C | 0.1 °C |
| **H.T** Relative humidity | % RH | From 3 to 98 % RH | **Accuracy** (repeatability, linearity, hysteresis)** :<br>±1.5% RH (from 15°C to 25°C)<br>**Factory calibration uncertainty:** ±0,88 %RH<br>**Temperature depandence:**<br>±0.04 x (T-20) % RH (if T<15°C or T>25°C) | 0.1 % RH |
| **H.T** Absolute humidity | g/Kg | From 0 to 600 g/kg | | 0.1 g/kg |
| | | | | |
| Dew point | $°C_{td}$, $°F_{td}$ | From -50 to +80°$C_{td}$ | ±0.6% of reading ±0.5°C | 0.1 °$C_{td}$ |
| Ambient temperature | °C, °F | From -40 to +180°C | ±0.3% of reading ±0.25°C | 0.1 °C |

***It's extremely unwise to remove the protection tip of our hygrometry probes as the sensitive element is very fragile even to light contacts. However, if you have to remove the protection tip, take all possible precautions and avoid any contact with the sensitive element.***
***To remove the protection tip, unscrew it or unclip it***

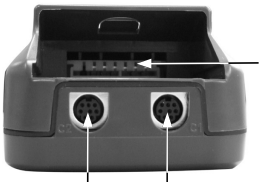



**Wireless or wire Pt100 probes (see related datasheet)** **Résolution :** 0.01 °C

*All accuracies indicated in this document were stated in laboratory conditions and can be guaranteed for measurements carried out in the same conditions, or carried out with required compensation.
** As per NFX 15-113 and the Charter 2000/2001 HYGROMETERS, GAL (Guaranteed Accuracy Limit) which has been calculated with a coverage factor value of 2 is ±2.88%RH between 18 and 28°C on the measuring range from 5 to 95%RH. Sensor drift is less than 1%RH/year.
*** The accuracy is expressed either by a deviation in °C or by a percentage of the value concerned. Only the bigger value is considered.

## Description

### Top view

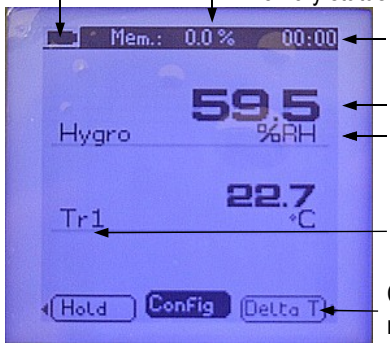


Module connections

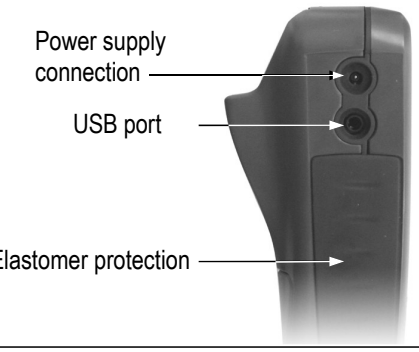
mini-Din C2 connector

mini-Din C1 connector

### Graphic display



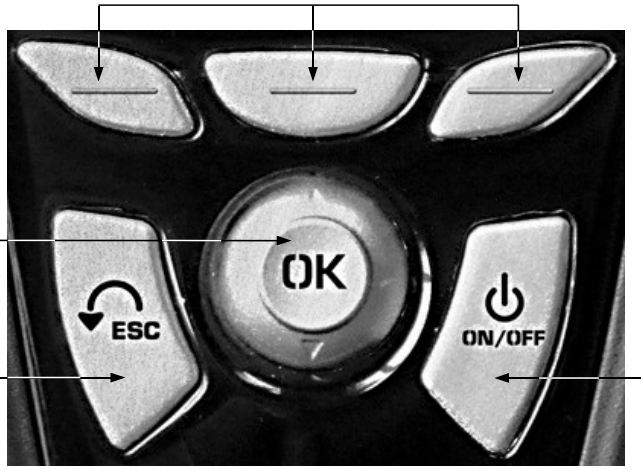

### Side view




### Keypad

Access keys for circular menu

**Browsing joystick** :
- 4 directions
- Validation




Escape key

On/Off key

## Connections

### Interchangeable measurement modules

Interchangeable modules with Smart-plus system are automatically recognized when connected to the instrument.

**1. Current / Voltage module**

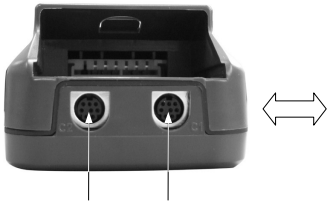
It allows current or voltage measurements on **V/A1** or **VA/2** channels with current/voltage input cables or ammeter clamps.

**2. Thermocouple module**

It allows thermocouple temperature measurement on **Tc1, Tc2, Tc3** and **Tc4** channels with type **K, J** or **T** with wire thermocouple probes equiped with a miniature male connector.

### Wire probes with Smart-plus system

Wire probes with Smart-plus system are automatically recognized when connected to the instrument.



mini-Din **C2** connector

mini-Din **C1** connector

Temperature and hygrometry probes are connected on min-DIN connectors **C1** and / or **C2**

Secured Mini-Din Connector

Retractable cable lg. 450 mm, up to 2.4 m.

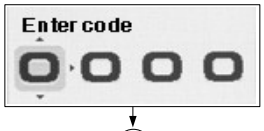
### Wireless probe/instrument communication

Wireless communication between probe and instrument with automatic recognition after power-up.

Hygrometry probes or Pt100 probes are displayed on **hygro, Tr1** or **Tr2** channels followed by wireless communication

***Wireless probes shall be located near the instrument for initial recognition. Connection between HD200 and wireless probes must be established. See submenu "Wireless probes" p 8.***

## Power-up




Enter key code with directional pad.
(if the locking is activated)
◄ ► and ▲ ▼

OK

Homepage display

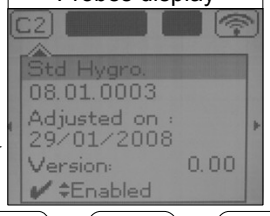
Infos ↔ Probe ↔ Params

Select a sub menu with access keys
or with arrow keys ◄ ►

OK

## Probe connection

Probes display




Select a connection with right and left keys ◄ ►
Connections can be activated or deactivated with ▲ or ▼

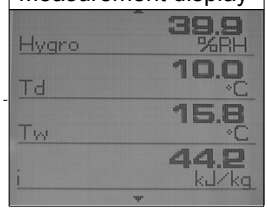
Infos ↔ Measure ↔ Params

Select a sub menu with access keys
or with arrow keys ◄ ►

## Measurement

Return to
previous screen

Measurement display

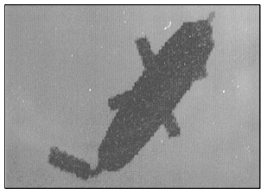



Probe ↔ Hold ↔ Config ↔ Delta T
Rec. ↔ Alarms ↔ Params ↔ Calc.

Select a sub menu with access keys
or with arrow keys ◄ ►

OK

## Communication interrupted



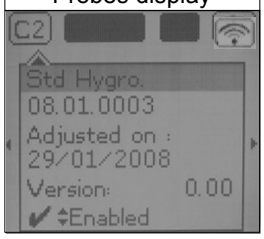
Check probes connection

## Probe menu

**1. Using wire probes and modules**

Wire probes and modules with Smart-plus system are automatically recognized from first connection.
The "**Probe**" menu only appears when probes or module are connected. This menu allows to view probe information plugged to **C2, Module, C1** or **wireless connections**.
(See « Connections » p 6 for more information about connections).

Probes display




Infos ↔ Measure ↔ Params

**Available information are :**

• Sensor type, Serial number, Date of last calibration or adjustement, Probes Status (enabled ou disabled).
On enabled mode, the probe is connected, the measurement is carried out and the value is displayed.
On disabled mode, the probe is connected, the measurement is not carried out and the value is not displayed.

**2. Using wireless communication**

**A- Add a wireless probe**

A1. Go to probe menu by pressing "**Probe**" access key.
A2. With arrow keys ◀ and ▶ , go to "**RF probes**" display.
A3. Select **New** with access key.
A4. Power up the probe and press multifunction button until LED blinks. Once the probe is recognized, information appears.
Left button ◀ allows to return to the wireless probes display and to access all wireless probes already recognized by the instrument. With access keys, it is possible to delete **Del** a wireless probe.

**RF probes display**

**RF probes searching**

**RF probes detected**

**RF probes display**

**B- Select a wireless probe already created.**

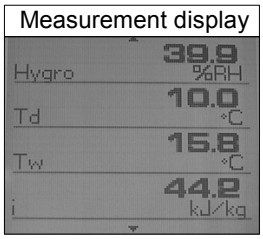
B1. Power up the wireless probe (short press on Multifunction button).
B2. Go to "**Probe**" menu.
B3. With arrows keys ◀ and ▶ , go to "**RF probes**" display. All the wireless probes already recognized appear.
B4. Select the suitable wireless probe with ▲ or ▼.
B5. Go to probe informations using arrow key ▶.
B6. Enable the wireless probe with arrows keys ▲ and ▼ and confirm with **OK** .

## Functions

The following functions are enabled only if at least one probe is connected.
You can access to the following sub-functions :

- Hold - Min/Max
- Configuration
- Delta T
- Parameters
- Calculation
- Recording

Measurement display




Probe ↔ Hold ↔ Config ↔ Delta T
Rec. ↔ Alarms ↔ Params ↔ Calc.

### Hold / Min-Max

Press 1x in order to select **HOLD** function : measurement holding on display.
Press 2x in order to select **Min-Max** function : display of minimum and maximum values.
Press 3x : back to the continuous measurement.

## Configuration

**If you use thermocouple probes, you must enter type into the Configuration sub-function.**

**Configuration sub-function allows to:**

• *Select thermocouple*

Click on **OK** or ▶ to enter into sub function : a list of thermocouple available ( K, J or T type) appears .
Select type with ▲ and ▼. Confirm with **OK**.

• *Select display*

Click on **OK** or ▶ to enter into sub function. Select channel required with arrow keys ▲ and ▼ and confirm with **OK**. Select respectively **ON** or **OFF** with ▲ and ▼ in order to enable or disable this function. Confirm with **OK** .

• *Select units*

Click on **OK** or ▶ to enter into sub function : a list of units available appears. For each channel, select unit required with ▲ and ▼.
Confirm with **OK**.
Click on **Esc** to return to previous screen.

## Delta T

When two PT100 probes or 2 thermocouple temperature probes are connected, HD200 can calculate Delta temperature value : the temperature difference between **C2** and **C1**, or **T2** and **T1**, or **T4** and **T3**.
Select **Delta T** in order to view the temperature difference.
If you select **Delta T** again, Delta T function is disabled.

## Calculation

Press the access key (Calc.). Press ▶ in order to enter in the submenu and choose calculation type (none, psychrometer or WGBT) by means of arrows keys ▲ and ▼ .
Confirm with **OK**. Select **Esc** to quit this menu.

***• Psychrometer***

**Wet Temperature (Tw)** is the temperature at which water evaporated into the air brings the air to saturation at the same temperature. It is expressed in Celsius degree .

**Absolute humidity (ρV)** is the ratio between the mass of water vapor present to the mass of dry gas. It is expressed in grams of water vapor per kiRecrams of dry gas.

**Dew-point temperature (Td)**: is the temperature to which the air must be cooled, at constant barometric pressure for water vapor to condense into water. It is expressed in Celsius degree.

**Contact dew-point temperature (Td)** is the dew point temperature measured by a PT100 contact probe. It is expressed in Celsius degree.

**Specific enthalpy (i)** is the total heat contained in 1 kg of wet air. It is expressed in kJ/kg.

***• WBGT index (Wet bulb globe temperature).*** For hygrometry probe coupled with black ball thermometer.

If WBGT index is selected, press ▼ then **OK** or ▶ and a list appears. Select **Inside** or **Outside** with arrow ▲ and ▼ .
Confirm with **OK**.
The **WBGT**, described as per **ISO 7243**, allows an evaluation of working climatic conditions.
Outdoors, the following formula is used:
$WBGT_{outside} = 0.7\ Thn + 0.2\ Tg + 0.1\ Ta$
Indoors, It is calculated from the following formula :
$WBGT_{inside} = 0.7\ Thn + 0.3\ Tg$
where: - **Thn** is the natural wet temperature,
- **Tg** is the temperature measured with a black ball thermometer
- and **Ta** is the ambient temperature.

## U coefficient

**U coefficient** is a thermal coefficient which allows to determine the variation between 2 ambient temperatures, taking into account the separation element between these 2 ambiances (a wall for instance).
Physics unit of **U** value is Watt per square meter and Kelvin degree : W/(m².K).
A low U value means that thermal isolation is good. When U value decreases, energy needs for heating **decrease** proportionately, and superficial temperatures **increase**. Therefore, indoor comfort is improved, and there is less risk of condensation on elements and items, which can generally be recognized by greyish stains, fungus, mouldy smell.

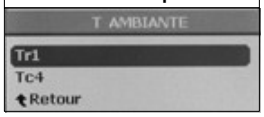
To activate **U coefficient :**
• thermocouple module shall be connected and active with at least one thermocouple probe on T1, T2 or T3 channel for contact temperature.
• at least one wire temperature probe, hygrometry, CO or CO2 on C1 or C2 channel, or one thermocouple probe on T4 channel for the ambient temperature

To calculate this coefficient, the device takes into account several parameters: .

**For contact temperature**, if several thermocouple probes are connected, the device will make the average of T1, T2 and T3 channels for U coef calculation.

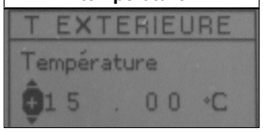
**For ambient temperature**, if several probes are connected, the device will display a selection screen, allowing to choose the probe for U coef calculation.

**Selection screen of ambiant temperature**



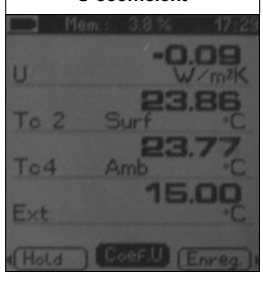

**For outside temperature**, if no wireless probe is connected, the device will display a screen, allowing to enter manually an outside temperature. Conversely, if several wireless probes are connected, the device will display a selection screen, allowing to choose the wireless probe for U coef calculation.

**Selection screen of ourside temperature**




U coef measuring screen appears when no probe or outside temperature has to be determined and probes and temperature are chosen.

**Measurement screen of U coefficient**




You can record values of the measuring screen of U coefficient :
**a.** Press on Enreg button.
**b.** Enter a name for the recording.
**c.** Validate.

## Alarms

Select respectively **ON** or **OFF** with ▲ and ▼ in order to enable or disable the alarm. Choose your thresholds: low temperature setpoint and high temperature setpoint. Confirm with **OK** or ▶ .
Select thresholds with **OK** or ▶ to enter temperature setpoints. Select + or – signs with ▲ and ▼ then pass on the first digit with ▶. Low and high **thresholds** entered, confirm with **OK** .

## Recording

The Recording menu allows a measurement dataset. You can choose between a planned or a continuous dataset.
Memory capacity of the instrument is up to **8,000** points or **50** datasets.

### 1. Create or launch a continuous dataset

A continuous dataset can be carried out using HD200 and is composed of several dated measuring points. The operator can choose an automatic or a manual dataset, with an instant value or an average. This datasets can't be set using Datalogger-10 Software.

#### 1.1 Manual dataset

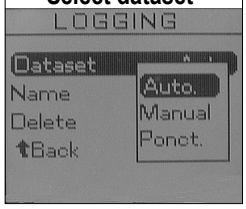
A **manual dataset** is composed of measuring points selected by the operator.

**a**. Click on **OK** or ▶ to enter into sub function.
**b**. Select **Manual** with ▲ and ▼. Confirm wih **OK**.
**c**. Select **Name** with ▲ and ▼. Confirm wih **OK** or ▶. Enter dataset name with arrow keys ◀ ▶ and ▲ ▼. Confirm wih **OK**.
**d.** For measurement launching, click on **OK** with the access key. The number of points selected and the parameter are displayed.
**e.** To save your dataset click on **Save** with the access key.

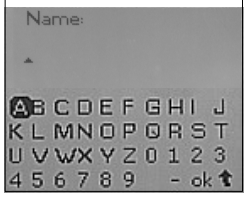
#### 1.2 Automatic dataset

An **automatic dataset** is composed of measuring points with interval of time.
**a**. Click on **OK** or ▶ to enter sub function.
**b**. Select **Auto.** with ▲ and ▼. Confirm wih **OK**.
**c**. Select **Name** with ▲ and ▼. Confirm wih **OK** or ▶. Enter dataset name with the arrow keys ◀ ▶ and ▲ ▼.
Confirm wih **OK**.
**d**. Enter dataset time and interval of time between 2 measurements by selecting **Period** with access key. Select **Duration** or **Interval** with ▲ and ▼. Confirm wih **OK**. Enter minutes and seconds with arrow keys▲ and ▼ ( from 1 minute to 24 hours for the duration and from 5 seconds to 10 minutes for the interval). Confirm with **OK**.
**e.** Select **Start** for dataset launching.

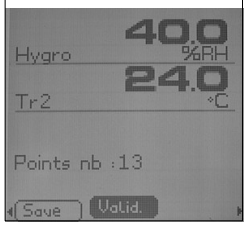
Select dataset




Enter name




Manual dataset




Automatic dataset

### 2. Launch a planned dataset

A planned dataset is composed of several locations. For each location, the operator can enter a theorical value and a tolerance for the parameter to be controlled. Planification must be made via the software.
**a**. Click on **OK** or ▶ to enter into sub function.
**b**. Select **Planned** with ▲ and ▼. Confirm wih **OK**.
**c**. Choose dataset name with ▲ and ▼. Confirm wih **OK**.
**d**. Select the location with ▲ and ▼. Confirm wih **OK**.

## 3. Preview of tables of points of datasets

Dataset summary

You can display tables of points of datasets performed on the device.

**a.** Go to **Recording** menu.
**b.** Select **Display**. Click on **OK** to validate.
**c.** Select **dataset name** with arrow keys ▲ et ▼. Click on **OK** to validate.
Summary screen of selected dataset is displayed. From this screen, you can :
• Select other dataset using arrow keys ◀ and ▶.
• Display data of other channels using arrow keys ▲ and ▼.

Dataset table

**d.** Click on **Mesure** to display values table of selected dataset.
From this screen you can :
• Browse values table of points of the same channel pressing **Prev.** or **Next.**
• Change of channel with arrow keys ◀ and ▶ .
• Back to dataset summary screen pressing **Visu.**

## 4. Delete all datasets

Select **Delete** with ▲ and ▼. Confirm wih **OK**.

## Parameters

- ***Language***

Click on **OK** or ▶ to enter and a list of languages available appears.
Select language with arrow keys ▲ and ▼ and Confirm wih **OK**.

- ***Date / time***

Click on **OK** or ▶ to enter into sub function. Enter the day with ▲ and ▼ then move to the next digit with ▶. Repeat this operation for the month, year, hour and minute. Confirm wih **OK**.

- ***Beep***

This sub-function allows to enable or disable the keypad beep. Click on **OK** or ▶ to enter into the sub function. Select respectively **ON** or **OFF** with ▲ and ▼ in order to enable or disable the beep.
Confirm wih **OK**.

- ***Extinction***

This sub-function allows to enable the automatic shut-off and to select the delay in minute. Click on **OK** or ▶ to enter into the sub function. Select, with ▲ and ▼, **OFF** in order to disable the automatic shut-off or enter the delay (from 15 to 120 minutes).
Confirm wih **OK**.

- ***RF logging***

This sub-function allows to enable or disable the **RF logging**. Click on **OK** or ▶ to enter into the sub function. Select respectively **ON** or **OFF** with ▲ and ▼ in order to enable or disable this function.
Confirm wih **OK**.

- ***Contrast***

This sub-function allows to modify the contast. Click on **OK** or ▶ to enter. Select your contrast level (from 0 to 9 or **AUTO**) with ▲ and ▼.
Confirm wih **OK**.

- ***Backlit***

This sub-function allows to modify the backlit. Click on **OK** or ▶ to enter. Select your backlit level (from 0 to 9 or **AUTO**) with ▲ and ▼. Confirm wih **OK**.

**If you select AUTO, the HD200 adjuts automatically the backlit according to the room brightness.**

- ***Key locking***

This sub-function allows to enable or disable the **key lock**. Click on **OK** or ▶ to enter into sub function. Select respectively **ON** or **OFF** with ▲ and ▼ in order to enable or disable this function.
Confirm wih **OK**.
If the locking is enabled, the code menu appears

- ***Code***

This sub-function allows to enter the **security code**. Click on **OK** or ▶ and the code appears. Enter the first digit of the code with ▲ and ▼ then move to the next one with ▶**.** Confirm wih **OK**.

## Downloading data

See DataLogger-10 user manual chapter **III – Read device** page 6.

# V – General informations

## Info menu

This menu allows to view the serial number of instrument and firmware version.

## Battery

When battery indicator flashes it is recommended to change the batteries:

1. Remove the front part at the back of the instrument.
2. Remove batteries
3. Insert new batteries (AA-LR6 1,5V) in accordance with proprer polarity drew inside the housing.
4. Replace the front.

## Maintenance

KIMO performs calibration, adjustment and maintenance of all your instruments to guarantee a constant level of quality of your measurements. In regards of Quality insurance norms, we recommend that the instruments are checked once a year.

## Warranty

KIMO Instruments have 1-year guarantee for any manufacturing defect (return to our After-Sales Service required for appraisal).

NTang – HD 200 – 19/08/10 – RCS (24) Périgueux 349 282 095 Non-contractual document – We reserve the right to modify the characteristics of our products without prior notice.

Once returned to Kimo, required waste collection will be assured in the respect of the environment in accordance to 2002/96/CE guidelines relating to WEEE.

**www.kimo.fr**

**EXPORT DEPARTMENT**
Boulevard de Beaubourg - Emerainville - BP 48
77312 MARNE LA VALLEE CEDEX 2
**Tel : + 33.1.60.06.69.25 - Fax : + 33.1.60.06.69.29**

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